

WHAT IS CLAIMED IS:

1. A heat releasing member comprising:

a frame-like substrate made of a matrix of tungsten or molybdenum and copper,

a through-metal member made of copper buried from an upper surface to another surface in a central portion of the frame-like substrate, and

copper layers joined onto the one and other surfaces of the substrate and the through-metal member so as to cover the one and other surfaces thereof.

2. A heat releasing member comprising:

a frame-like substrate made of a matrix of tungsten or molybdenum and copper,

a through-metal member made of diamond and a silver-copper alloy copper buried from an upper surface to another surface in a central portion of the frame-like substrate, and

copper layers joined onto the one and other surfaces of the substrate and the through-metal member so as to cover the one and other surfaces thereof.

3. A package for accommodating a semiconductor element comprising:

the heat releasing member of claim 1 being plate-like

and having a mounting portion on which a semiconductor element is mounted in a central portion on its upper surface; and

a frame attached onto one surface of the heat releasing member so as to surround the mounting portion and having a plurality of wiring conductors extending from a periphery of the mounting portion inside to an outer surface.

4. The package of claim 3, wherein the through-metal member has an outer circumference larger than that of the semiconductor element by the thickness of the substrate.

5. The package of claim 3, wherein a size of the one surface of the through-metal member is equal to a size of the semiconductor element, and a size of the other surface thereof is larger than that of the one surface thereof.

6. The package of claim 3, wherein a cross-section area of the through-metal member is gradually increased from a center side of the substrate to joint portions with the copper layers.

7. The package of claim 3, wherein an arithmetical mean roughness R_a in a central portion of the one surface of the copper layer on which the semiconductor element is mounted is $0.05 \mu\text{m} \leq R_a \leq 30 \mu\text{m}$.

8. A package for accommodating a semiconductor element comprising:

the heat releasing member of claim 2 being plate-like and having a mounting portion on which a semiconductor element is mounted in a central portion on its upper surface; and

a frame attached onto one surface of the heat releasing member so as to surround the mounting portion and having a plurality of wiring conductors extending from a periphery of the mounting portion inside to an outer surface.

9. The package of claim 8, wherein the through-metal member has an outer circumference larger than that of the semiconductor element by the thickness of the substrate.

10. A package for accommodating a semiconductor element comprising:

a plate-like heat releasing member having a mounting portion on which a semiconductor element is mounted in a central portion on one surface thereof;

a frame attached onto the one surface of the heat releasing member so as to surround the mounting portion and having a plurality of wiring conductors extending from a periphery of the mounting portion inside to an outer surface; and

a lid attached onto on surface of the frame so as to

cover the mounting portion,

wherein in the heat releasing member, a plurality of through-metal members made of a copper are buried from one surface of the mounting portion of a plate-like substrate made of a matrix of tungsten or molybdenum and copper to another surface,

copper layers are joined at least to one and other surfaces of a portion in which the through-metal members of the substrate are buried, and

a cross-section area of each of the through-metal members is gradually increased from the center side of the substrate to a joint portion with the copper layers.

11. A package for accommodating a semiconductor element comprising:

a plate-like heat releasing member having a mounting portion on which a semiconductor element is mounted in a central portion on one surface of the plate-like heat releasing member;

a frame attached onto the one surface of the heat releasing member so as to surround the mounting portion; and

a terminal attached onto one portion of the frame,

wherein after the semiconductor element is mounted, the semiconductor element, the mounting portion, the frame and the terminal are sealed with a sealing resin covering up to the side face of the heat releasing member in such a manner that

the end portion on the outer side of the terminal is exposed,
and

wherein in the heat releasing member, a plurality of through-metal members made of a copper are buried from the one surface of the mounting portion of a plate-like substrate made of a matrix of tungsten or molybdenum and copper to the other surface,

copper layers are joined at least to the one surface of a portion of the substrate positioned inside the frame and on the other surface of a portion in which the through-metal members are buried, and

an arithmetical mean roughness R_a on the one surface of the portion positioned inside the frame and the side face of the heat releasing member is each $0.05 \mu\text{m} \leq R_a \leq 30 \mu\text{m}$.

12. A semiconductor device comprising:

the package for accommodating a semiconductor element of claim 3; and

a semiconductor element-mounted in the mounting portion of the package for accommodating a semiconductor element,

wherein an electrode of the semiconductor element is electrically connected to the wiring conductor and a lid is attached onto the one surface of the frame so as to cover the mounting portion.

13. A semiconductor device comprising:

the package for accommodating a semiconductor element of claim 3; and

a semiconductor element mounted in the mounting portion of the package for accommodating a semiconductor element,

wherein an electrode of the semiconductor element is electrically connected to the wiring conductor and a sealing resin is injected into a recess formed by the heat releasing member and the frame to seal the semiconductor element.

14. A semiconductor device comprising:

the package for accommodating a semiconductor element of claim 8; and

a semiconductor element mounted in the mounting portion of the package for accommodating a semiconductor element,

wherein an electrode of the semiconductor element is electrically connected to the wiring conductor and a lid is attached onto the one surface of the frame so as to cover the mounting portion.

15. A semiconductor device comprising:

the package for accommodating a semiconductor element of claim 8; and

a semiconductor element mounted in the mounting portion of the package for accommodating a semiconductor element,

wherein an electrode of the semiconductor element is electrically connected to the wiring conductor and a sealing resin is injected into a recess formed by the heat releasing member and the frame to seal the semiconductor element.

16. A semiconductor device comprising:

the package for accommodating a semiconductor element of claim 10; and

a semiconductor element mounted in the mounting portion of the package for accommodating a semiconductor element,

wherein an electrode of the semiconductor element is electrically connected to the wiring conductor and the lid is attached onto the one surface of the frame so as to cover the mounting portion.

17. A semiconductor device comprising:

the package for accommodating a semiconductor element of claim 11; and

a semiconductor element mounted on the mounting portion of the package for accommodating a semiconductor element,

wherein an electrode of the semiconductor element is electrically connected to the terminal, and the semiconductor element, the mounting portion, the frame and the terminal are sealed with a sealing resin covering up to the side face of the heat releasing member in such a manner that an end portion

on the outer side of th terminal is exposed.